

- A³ amended
- (b) a nucleotide sequence which encodes a polypeptide comprising the amino acid sequence set forth in SEQ ID NO: 2;
 - (c) a nucleotide sequence comprising at least 75% identity to the nucleotide sequence set forth in SEQ ID NO: 1;
 - (d) a nucleotide sequence encoding a polypeptide having acyl-CoA thioesterase activity, wherein said nucleotide sequence comprises at least 24 contiguous bases of the nucleotide sequence set forth in SEQ ID NO: 1;
 - (e) the nucleotide sequence set forth in SEQ ID NO: 3;
 - (f) the nucleotide sequence set forth in SEQ ID NO: 5; and
 - (g) a nucleotide sequence complementary to a nucleotide sequence of (a), (b), (c), (e), or (f);

wherein the level of oil or the level of at least one constituent of said oil is increased in at least one part of said plant.

18. (Amended) A method for optimizing a plant for seed oil production comprising:
transforming at least one cell of said plant with a first nucleotide construct comprising a first nucleotide sequence or fragment thereof, so as to increase or decrease acyl-CoA thioesterase expression in a seed, said first nucleotide sequence selected from the group consisting of:

- A⁴
- (a) the nucleotide sequence set forth in SEQ ID NO: 1,
 - (b) a nucleotide sequence which encodes a polypeptide comprising the amino acid sequence set forth in SEQ ID NO: 2,
 - (c) a nucleotide sequence comprising at least 75% identity to the nucleotide sequence set forth in SEQ ID NO: 1,
 - (d) a nucleotide sequence encoding a polypeptide having acyl-CoA thioesterase activity, wherein said nucleotide sequence comprises at least 24 contiguous bases of the nucleotide sequence set forth in SEQ ID NO: 1,
 - (e) the nucleotide sequence set forth in SEQ ID NO: 3,
 - (f) the nucleotide sequence set forth in SEQ ID NO: 5, and

- (g) a nucleotide sequence complementary to a nucleotide sequence of (a), (b), (c), (e), or (f); and

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transforming said cell with a second nucleotide construct comprising a second nucleotide sequence or fragment thereof, so as to decrease the level or activity of acyl-CoA oxidase or multifunctional protein type II in a seed, said second nucleotide sequence selected from the group consisting of an acyl-CoA oxidase nucleotide sequence or a multifunctional protein type II nucleotide sequence;

wherein the level of oil or the level of at least one constituent of said oil is increased in at least one part of said seed.

21. (Amended) A transformed plant comprising in its genome a stably incorporated nucleotide construct comprising a promoter that drives expression a plant operably linked to a nucleotide sequence encoding an acyl-CoA thioesterase, said nucleotide sequence selected from the group consisting of:

- A5
- (a) the nucleotide sequence set forth in SEQ ID NO: 1;
 - (b) a nucleotide sequence which encodes a polypeptide comprising the amino acid sequence set forth in SEQ ID NO: 2;
 - (c) a nucleotide sequence comprising at least 75% identity to the nucleotide sequence set forth in SEQ ID NO: 1;
 - (d) a nucleotide sequence encoding a polypeptide having acyl-CoA thioesterase activity, wherein said nucleotide sequence comprises at least 24 contiguous bases of the nucleotide sequence set forth in SEQ ID NO: 1;
 - (e) the nucleotide sequence set forth in SEQ ID NO: 3;
 - (f) the nucleotide sequence set forth in SEQ ID NO: 5; and
 - (g) a nucleotide sequence complementary to a nucleotide sequence of (a), (b), (c), (e), or (f);

wherein the level of said acyl-CoA thioesterase is decreased or increased in said plant or part thereof.

30. (Amended) A transformed plant cell comprising in its genome a stably incorporated nucleotide construct comprising a promoter that drives expression a plant operably linked to a nucleotide sequence encoding an acyl-CoA thioesterase, said nucleotide sequence selected from the group consisting of:

- A6
- (a) the nucleotide sequence set forth in SEQ ID NO: 1;
 - (b) a nucleotide sequence which encodes a polypeptide comprising the amino acid sequence set forth in SEQ ID NO: 2;
 - (c) a nucleotide sequence comprising at least 75% identity to the nucleotide sequence set forth in SEQ ID NO: 1;
 - (d) a nucleotide sequence encoding a polypeptide having acyl-CoA thioesterase activity, wherein said nucleotide sequence comprises at least 24 contiguous bases of the nucleotide sequence set forth in SEQ ID NO: 1;
 - (e) the nucleotide sequence set forth in SEQ ID NO: 3;
 - (f) the nucleotide sequence set forth in SEQ ID NO: 5; and
 - (g) a nucleotide sequence complementary to a nucleotide sequence of (a), (b), (c), (e), or (f);

wherein the level of said acyl-CoA thioesterase is decreased or increased in said plant cell.

32. (Amended) The plant of claim 31, wherein said first nucleotide sequence is selected from the group consisting of:

- A7
- (a) the nucleotide sequence set forth in SEQ ID NO: 1;
 - (b) a nucleotide sequence which encodes a polypeptide comprising the amino acid sequence set forth in SEQ ID NO: 2;
 - (c) a nucleotide sequence comprising at least 75% identity to the nucleotide sequence set forth in SEQ ID NO: 1;
 - (d) a nucleotide sequence encoding a polypeptide having acyl-CoA thioesterase activity, wherein said nucleotide sequence comprises at least 24 contiguous bases of the nucleotide sequence set forth in SEQ ID NO: 1;

- A7
consider
- (e) the nucleotide sequence set forth in SEQ ID NO: 3;
 - (f) the nucleotide sequence set forth in SEQ ID NO: 5; and
 - (g) a nucleotide sequence complementary to a nucleotide sequence of (a), (b), (c), (e), or (f).
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36. (Amended) The plant cell of claim 35, wherein said first nucleotide sequence is selected from the group consisting of:

- A8
- (a) the nucleotide sequence set forth in SEQ ID NO: 1;
 - (b) a nucleotide sequence which encodes a polypeptide comprising the amino acid sequence set forth in SEQ ID NO: 2;
 - (c) a nucleotide sequence comprising at least 75% identity to the nucleotide sequence set forth in SEQ ID NO: 1;
 - (d) a nucleotide sequence encoding a polypeptide having acyl-CoA thioesterase activity, wherein said nucleotide sequence comprises at least 24 contiguous bases of the nucleotide sequence set forth in SEQ ID NO: 1;
 - (e) the nucleotide sequence set forth in SEQ ID NO: 3;
 - (f) the nucleotide sequence set forth in SEQ ID NO: 5; and
 - (g) a nucleotide sequence complementary to a nucleotide sequence of (a), (b), (c), (e), or (f).
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